METHODS OF SAMPLING AND TESTING
MT 405-04
WIRE CLOTH SIEVES FOR TESTING PURPOSES
(Modified AASHTO M 92)

1 Scope:

1.1 This specification covers the requirements for the design and construction of sieves using a medium of woven-wire cloth mounted in a frame for use in testing for the classification of materials according to designated nominal particle size and wire cloth, meeting the specifications of Table 1, to be designated test grade wire cloth. All subsequent references to wire cloth shall mean test grade wire cloth.

2 Referenced Documents:

2.1 *AASHTO:*
M 92 Wire Cloth and Sieves for Testing Purposes

3 Sieve Cloth Requirements:

3.1 Wire cloth used in U.S.A. standard testing sieves meeting the specifications shown in Table 1 shall be designated “test grade”. Test grade cloth shall be woven from stainless steel, brass, bronze, or other suitable wire with a plain weave, except that cloth with openings of 63 µm (No. 230) and finer may be woven with a twill weave. The wire shall not be coated or plated.

3.2 The openings of the sieve cloth of successive sieves from a base of 1 mm in the ration of approximately $4\sqrt{2}$:1.

3.3 All measurements of openings and wire diameters shall be made along the midpoints of the opening.

3.4 Sieve cloth shall conform to the dimensional requirements of Table 1. The average opening (distance between parallel wires measured at the center of the opening), in the horizontal and vertical directions measured separately, shall conform to the values in Column 1, within the permissible variation in average opening size shown in column 4. Not more than 5% of the openings shall exceed the value shown in Column 5. The maximum individual opening size shall not exceed the value shown in Column 6.

3.4.1 The average diameter of the horizontal and vertical wires, measured separately, shall conform to the diameter in Column 7 within the tolerances in Footnote A of Table 1.

3.5 Wires shall be crimped in such a manner that they will be rigid when in use.

3.6 There shall be no punctures or obvious defects in the wire cloth.

4 Test Sieve Frames:

4.1 *General Requirements* - Frames for wire cloth sieves shall be constructed in such a manner as to be rigid. The wire cloth shall be mounted on the frame without distortion, looseness or waviness. To prevent the material being sieved from catching in the joint between the wire cloth and the frame, the joint shall be filled smoothly or constructed so the material will not be trapped.

4.2 *Standard Frames*--The standard sieve frame shall be circular with nominal diameters of 3, 6, 8, 10 or 12 inches (76, 512, 203, 254, or 305 mm) as may be specified. The dimensions shall conform to the requirements of Table 2. Frames shall be made from noncorrosive material such as brass or stainless steel and be of seamless construction.

4 Test Sieve Frames: (continued)

4.2.1 The bottom of the frame shall be constructed so as to provide an easy sliding fit with any sieve frame of the same nominal diameter conforming to the specified dimensions.

4.2.2 The joint or fillet at the connection of the sieve cloth to the frame will provide a minimum clear sieving surface with a diameter equal to the nominal diameter less 0.5 in. (13 mm).

4.3 *Nonstandard Frames* – Other sieve frames may be square, rectangular, or circular. The frame may have the sieve cloth permanently installed, or be designed to permit replacement. The provisions of 5.1 apply.

Note 1 – While there are no requirements for nesting of nonstandard frames, care should be applied in the use to prevent loss of material during analysis.

4.4 *Pans and Covers* – Pans and covers for use with sieves shall be made so as to nest with the sieves. Pans with extended rims (“stacking skirts”) shall be furnished when specified. The pans and covers shall conform to the dimensions of Table 2.

5 Product Marking:

4.1 Each sieve shall bear a label marked with the following information:

4.1.1 U.S.A. Standard Testing Sieve,

4.1.2 ASTM designation E 11,

4.1.3 Standard sieve designation (from Table 1, Column 1),

4.1.4 Name of manufacturer or distributor, and

4.1.5 Alternative sieve designation (from Table 1, Column 2) Optional.

4.1.6 Each test sieve shall bear a unique serial number permanently engraved or etched onto the sieve frame, skirt or nameplate.

TABLE 1 Nominal Dimensions, Permissible Variations for Wire Cloth of Standard Test Sieves (U.S.A. Standard Series)

Sieve Designation		Nominal Sieve Opening, in.[c]	Permissible Variation of Average Opening from the Standard Sieve Designation	Maximum Opening Size for Not More than 5% of Openings	Maximum Individual Opening	Nominal Wire Diameter, mm[a]
Standard[b] mm	Alternative		mm	mm	mm	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
125	5 in.	5	±3.7	130.0	130.9	8.0
106	4.24 in.	4.24	±3.2	110.2	111.1	6.40
100[d]	4 in.[d]	4	±3.0	104.0	104.8	6.30
90	3½ in.	3.5	±2.7	93.6	94.4	6.08
75	3 in.	3	±2.2	78.1	78.7	5.80
63	2½ in.	2.5	±1.9	65.6	66.2	5.50
53	2.12 in.	2.12	±1.6	55.2	55.7	5.15
50[d]	2 in.[d]	2	±1.5	52.1	52.6	5.05
45	1¾ in.	1.75	±1.4	46.9	47.4	4.85
37.5	1½ in.	1.5	±1.1	39.1	39.5	4.59
31.5	1¼ in.	1.25	±1.0	32.9	33.2	4.23
26.5	1.06 in.	1.06	±0.8	27.7	28.0	3.90
25.0[d]	1 in.[d]	1	±0.8	26.1	26.4	3.80
22.4	7/8 in.	0.875	±0.7	23.4	23.7	3.50
19.0	3/4 in.	0.750	±0.6	19.9	20.1	3.30
16.0	5/8 in.	0.625	±0.5	16.7	17.0	3.00
13.2	0.530 in.	0.530	±0.41	13.83	14.05	2.75
12.5	1/2 in.[d]	0.500	±0.39	13.10	13.31	2.67
11.2	7/16 in.	0.438	±0.35	11.75	11.94	2.45
9.5	3/8 in.	0.375	±0.30	9.97	10.16	2.27
8.0	5/16 in.	0.312	±0.25	8.41	8.58	2.07
6.7	0.265 in.	0.265	±0.21	7.05	7.20	1.87
6.3[d]	1/4 in.[a]	0.250	±0.20	6.64	6.78	1.82
5.6	No. 3½	0.223	±0.18	5.90	6.04	1.68
4.75	No. 4	0.187	±0.15	5.02	5.14	1.54
4.00	No. 5	0.157	±0.13	4.23	4.35	1.37
3.35	No. 6	0.132	±0.11	3.55	3.66	1.23
2.80	No. 7	0.111	±0.095	2.975	3.070	1.10
2.36	No. 8	0.0937	±0.080	2.515	2.600	1.00
2.00	No. 10	0.0787	±0.070	2.135	2.215	0.900
1.70	No. 12[c]	0.0661	±0.060	1.820	1.890	0.810
1.40	No. 14	0.0555	±0.050	1.505	1.565	0.725
1.18	No. 16	0.0469	±0.045	1.270	1.330	0.650
1.00	No. 18	0.0394	±0.040	1.080	1.135	0.580
0.850	No. 20	0.0331	±0.035	0.925	0.970	0.510
0.710	No. 25	0.0278	±0.030	0.775	0.815	0.450
0.600	No. 30	0.0234	±0.025	0.660	0.695	0.390
0.500	No. 35	0.0197	±0.020	0.550	0.585	0.340
0.425	No. 40	0.0165	±0.019	0.471	0.502	0.290
0.355	No. 45	0.0139	±0.016	0.396	0.425	0.247
0.300	No. 50	0.0117	±0.014	0.337	0.363	0.215
0.250	No. 60	0.0098	±0.012	0.283	0.306	0.180
0.212	No. 70	0.0083	±0.010	0.242	0.263	0.152
0.180	No. 80	0.0070	±0.009	0.207	0.227	0.131
0.150	No. 100	0.0059	±0.008	0.174	0.192	0.110

TABLE 1 Nominal Dimensions, Permissible Variations for Wire Cloth of Standard Test Sieves (U.S.A. Standard Series)

Sieve Designation		Nominal Sieve Opening, in.[c]	Permissible Variation of Average Opening from the Standard Sieve Designation mm	Maximum Opening Size for Not More than 5% of Openings mm	Maximum Individual Opening mm	Nominal Wire Diameter, mm[a]
Standard[b] mm	Alternative					
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0.125	No. 120	0.0049	±0.007	0.147	0.163	0.091
0.106	No. 140	0.0041	±0.006	0.126	0.141	0.076
0.0090	No. 170	0.0035	±0.005	0.108	0.122	0.064
0.075	No. 200	0.0029	±0.005	0.091	0.103	0.053
0.063	No. 230	0.0025	±0.004	0.077	0.089	0.044
0.053	No. 270	0.0021	±0.004	0.066	0.076	0.037
0.045	No. 325	0.0017	±0.003	0.057	0.066	0.030
0.038	No. 400	0.0015	±0.003	0.048	0.057	0.025
0.032[d]	No. 450[d]	0.0012	±0.003	0.042	0.050	0.028
0.025[d]	No. 500[d]	0.0010	±0.003	0.034	0.041	0.025
0.020[d]	No. 635[d]	0.0008	±0.003	0.029	0.035	0.020

TABLE 2 Dimensions of Standard Frames

Nominal Diameter	Mean Diameter, in. (mm)		Typical Frame[A]
In.	Inside at Top[B]	Outside of Skirt	Nominal Height[C] in. (mm)
3	3.000 + 0.030/-0.000 (76 + 0.76/ -0.00)	3.000 + 0.000/-0.030 (76 + 0.00/ -0.76)	1 1/4 (32) FH[D] 5/8 (16) HH
6	6.000 + 0.030/-0.000 (152 + 0.76/ -0.00)	6.000 + 0.000/-0.030 (152 + 0.00/ -0.76)	1 3/4 (45) FH 1 (25) HH
8	8.000 + 0.030/-0.000 (203 + 0.76/ -0.00)	8.000 + 0.000/-0.030 (203 + 0.76/ -0.76)	2 (50) FH 1 (25) HH
10	10.000 + 0.030/-0.000 (254 + 0.76/ -0.00)	10.000 + 0.000/-0.030 (254 + 0.00/ -0.76)	3 (76) FH 1 1/2 (38) HH
12	12.000 + 0.030/-0.000 (305 + 0.76/ -0.00)	12.000 + 0.000/-0.030 (305 + 0.00/ -0.76)	3 1/4 (83) FH 2 (50) IH 1 5/8 (41) HH

[A] Other frame heights are not precluded.
[B] Measured 0.2 in. (5 mm) below the top of the frame.
[C] Distance from the top of the frame to the sieve cloth surface.
[D] FH = full height, HH = half height, IH = intermediate height.